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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Horst Wernz

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7842

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7590

11/12/2009

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EXAMINER

NGO, TANYA T

ART UNIT

PAPER NUMBER

2613

NOTIFICATION DATE

DELIVERY MODE

11/12/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/562,760	Applicant(s) WERNZ ET AL.	
	Examiner TANYA NGO	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 18 September 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-28 is/are pending in the application.
- 4a) Of the above claim(s) 1-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-18, 20-22 and 27 is/are rejected.
- 7) ☒ Claim(s) 19, 22-26 and 28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 April 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/22/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings were received on 4/22/2009. These drawings are acceptable.

Response to Arguments

2. Applicant's arguments with respect to claim 15 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 15 and 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida et al (herein Ishida) US PG PUB 2006/0245763 and Miyamoto et al (herein Miyamoto) US Patent 6,865,348.

Re claim 15, Ishida discloses a transmitter for an optical RZ-DPSK communication signal (*Fig. 1*), comprising:

- a) a source for an optical carrier (*1, light source, Fig. 1*);
- b) an electro-optical modulator (*2, Mach-Zehnder interferometer type intensity modulator*) having at least one element with an optical path length adapted to be modified by an electrical driver signal for intensity modulating the optical carrier based

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on the driver signal (*The MZ interferometer is further disclosed in Fig. 2, where the light is input from the left end, and the RZ-DSPK is output from the right end. The optical electrode 21-1 is connected to the data input terminal and the electrode 21-2 is connected to an inverted data input terminal 18, and will modulate the phase of each optical path, paragraph [0040]*) ; and

c) a driver circuit (*RZ encoder 4, Fig. 1*) for generating the driver signal from an electrical communication signal (*the RZ encoder is fed electrical signals D and E, where are the positive phase, and reversed phased differential signal, Fig. 3, and outputs two signals, which comprise the driver signal G and F*), the driver signal being an impulse-type signal having impulses of two types (*the driver signals F and G, are both impulse signals, Fig. 4, and have two impulse types, a positive phase RZ differential signal, F, Fig. 4, and a reversed phase RZ differential signal, G, Fig. 4*) spaced in time by a neutral signal state (*between all of the pulses, the pulse always returns to a neutral state, or zero, Fig. 4*), and wherein during the neutral signal state of the driver signal, a transmission of the modulator becomes zero . *Furthermore, their intensities both return to zero between each pulse, therefore*), and the two types of impulses cause the transmission of the modulator to be different from zero and a phase shift which is specific for each type of the impulses (*the two signals are output from the RZ encoder 4, to the MZ interferometer, which outputs signal H, Fig. 3, which is further disclosed in Fig. 4, that the two types of impulses cause the output of the modulator to be different from zero to a phase shift for each type of impulse*).

Ishida does not appear to explicitly disclose wherein the impulses of the two types have opposite signs. However, Miyamoto discloses an optical transmission system, Fig. 11A, in which the optical signal that was output from the modulator (7, Fig. 11A, which comprises of a MZ optical intensity modulator 71, Fig. 11A, Col. 12, lines 62-34) varied between the phase of 0 and π (signal P11 is the output of the optical modulator 7, Fig. 11A wherein signal P11 is further disclosed in Fig. 14C as alternating between phases of 0 and π) and that the driving signal (P10, Fig. 11A further disclosed in Fig. 13B) is disclosed has having two different signal, where the driving signal P10 is a duo binary RZ electrical signal (Col. 19, lines 35-36). Ishida and Miyamoto are analogous art because they are from the same field of endeavor, optical transmission and modulator on an RZ electrical signal. At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Ishida and Miyamoto before him or her, to be able to interpret or understand that the two output signals of the RZ encoder of Ishida, signals F and G in Fig. 4 comprise of opposite signs like the electrical RZ signal of Miyamoto.

Re Claim 16, Ishida and Miyamoto disclose all the elements of claim 15, which claim 16 is dependent upon. Furthermore, Ishida discloses in that the specific phase shifts differ by π (Fig. 4, Signal H, paragraph [0046]).

Re claim 20, Ishida and Miyamoto disclose all the elements of claim 15, which claim 20 is dependent upon. Ishida discloses in that the driver circuit comprises a difference circuit (the RZ encoder 4, Fig 1 is directly connect to a differential encoder 3, Fig. 1) for forming a pre-coded signal (the differential encoder generate a differentially encoded signal based on the Data

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signal, paragraph [0030]. Since the output of the differential encoder is the input signal of the RZ encoder, Fig. 1, the encoded output of the differential encoder is considered the pre-coded signal), representative of a difference between subsequent bits of the electrical communication signal, and the driver signal is derived from the pre-coded signal (the differential encoder comprises of a exclusive OR circuit, Fig. 3, that receives the data signal, which is the present data bit, and an input from a one-bit delay circuit, which sends the bit prior to the present data bit. The exclusive OR circuit compares the bit and will output a "high" signal if the two subsequent bits are different and a "low" signal if the two subsequent bits are the same. Therefore the signal being output from the XOR circuit is representative of a difference between subsequent bits of the communication signal).

5. Claims 17 - 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida and Miyamoto as applied to claim 15 above, and further in view of Winzer US PG PUB 2003/0007231 A1 and Singh et al (herein Singh) US Patent 6,185,345.

Re claim 17, Ishida and Miyamoto disclose all the elements of claim 15, which claim 17 is dependent upon. Ishida and Miyamoto disclose in that the modulator is an interferometer having arms (*Ishida discloses that the modulator is a Mach-Zehnder Interferometer, 2, Fig. 1, which has two arms, Fig. 1*). Ishida and Miyamoto do not appear to explicitly disclose in which the optical path length of at least one of the arms is controllable by the driver signal, and in which a neutral signal level corresponds to a path length difference between the arms of half of a carrier wavelength of the optical carrier. However, Winzer discloses an RZ optical signal generator (*Fig. 1*), that includes a delay-line

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interferometer (*115, Fig. 1*) such that one of the interferometer arms 116 includes an adjustable delay element 117 which is arranged to control the amount of delay introduced into the optical signal in each interferometer arm with respect to the other (*paragraph [0010]*) wherein the delay will determined the duty cycle and the neutral signal of the cycle. Ishida, Miyamoto, and Winzer are analogous art because they are from the same field of endeavor, optical modulation of RZ pulse. At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Ishida, Miyamoto and Winzer before him or her, to modify the interferometer of Ishida and Miyamoto to include the delay element of Winzer because it allow the individual with implement a desired duty cycle in the provided RZ pulses (*paragraph [0010]*), which enables better synchronization.

Winzer does not appear to explicitly disclose that they delay difference is implemented by a difference in path length. However, Singh discloses the implementation of variable delay in a Mach-Zehnder interferometer is implemented by effecting the relative optical path length between the first and second optical waveguides. Winzer, Ishida, and Singh are analogous art because they are from the same problem-solving area, implementing a variable delay in a Mach-Zehnder interferometer. At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Winzer, Ishida and Singh before him or her, to understand the delay element of the Mach-Zehnder interferometer of Winzer and Ishida to as a variation of the relative optical path length between the first and second waveguides in the Mach-Zehnder interferometer (*Col. 11, lines 11-17*).

Re claim 18, Ishida, Miyamoto, Winzer, and Singh disclose all the elements of claim 17, which claim 18 is dependent upon. Furthermore, Ishida discloses two conductors are used for transmitting the driver signal (*electrodes 21-1 and 21-2, further disclosed on Fig. 2, are connected to the RZ encoder, which outputs the driver signal, according to Fig. 1*), wherein the impulses of a first type are transmitted on a first of the conductors, and wherein the impulses of a second type are transmitted on a second of the conductors *where optical electrode 21-1 is connected to the data input terminal 17, and electrode 21-2 is connected to an inverted data input 18, paragraph [0040]*).

Re claim 19, Ishida, Miyamoto, Winzer, and Singh disclose all the element 18, which claim 19 is dependent upon. Winzer discloses various arrangements for interferometer 115 will be apparent to person skilled in the art, including two separate delay elements, one in each interferometer arm, that each provide one of the coarse and fine delays described above, wherein one may be fixed and the other adjustable or controllable, paragraph [0013]. Winzer does not explicitly disclose that the two arms each comprise of a controllable optical path length. However, at the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Winzer before him or her, to modify the interferometer of Winzer and Ishida to have both delays or optical path length adjusters controllable because each delay provides either coarse or fine delay, paragraph [0013], and it would allow the user to control the coarse delay independently from the fine delay of the system.

Naturally flowing from the combination, since there is a delay element in each as, as disclosed by Winzer, and a conductor in each arm, as disclosed by Ishida. There is delay in one arm will be connected to the conductor present in said arm because they are both connected to the same optical path.

6. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida and Miyamoto as applied to claim 20 above, and further in view of Roberts et al (herein Roberts) US Patent 4,975,595.

Re claim 21, Ishida and Miyamoto disclose all the elements of claim 20, which claim 20 is dependent upon. Ishida discloses the difference circuit comprises an XOR-gate (*32, Fig. 3*) and a one bit delay circuit, (*31, Fig. 3*). Ishida does not appear to explicitly disclose and a flip-flop along with the XOR-gate. However, Roberts discloses a well known in the art of electronic circuits are D-type flip flop is a binary device used to provide a one-bit delay. At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Ishida and Roberts before him or her, to modify the differential encoder of Ishida to include the D-type flip flop of Roberts as the one-bit delay device because a flip-flop is a well known device that is able of providing a one bit delay in logical circuits (*Col. 1, lines 26-34*), and due its wide application and common use, it is also cost effective.

7. Claim 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida and Miyamoto as applied to claim 15 above, and further in view of Winzer US PG PUB 2003/0007231.

Re claim 27, Ishida and Miyamoto disclose all the elements of claim 15, which claim 27 is dependent upon. Ishida and Miyamoto do not appear to explicitly disclose and a control means for varying a ratio between duration of the impulses and duration of the neutral signal state. However, Winzer discloses Winzer discloses an RZ optical signal generator (*Fig. 1*), that includes a delay-line interferometer (*115, Fig. 1*) such that one of the interferometer arms 116 includes an adjustable delay element 117 which is arranged to control the amount of delay introduced into the optical signal in each interferometer arm with respect to the other (*paragraph [0010]*) wherein the delay will determined the duty cycle (*Claim Text 3*), which is the ratio or fraction of the pulse duration and the duration of the neutral signal. Ishida, Miyamoto, and Winzer are analogous art because they are from the same field of endeavor, optical modulation of RZ pulse. At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Ishida, Miyamoto and Winzer before him or her, to modify the interferometer of Ishida and Miyamoto to include the delay element of Winzer because it allow the individual with implement a desired duty cycle in the provided RZ pulses (*paragraph [0010]*), which enables better synchronization.

Re claim 28, Ishida, Miyamoto, and Winzer disclose all the elements of claim 27, which claim 28 is dependent upon. Furthermore, Ishida discloses a clock signal being input into the RZ encoder, which is the control means of the modulator that varies the duty cycle according to the prior rejection. Ishida, Miyamoto, and Winzer do not explicitly disclose that a mono-flop is located in the clock link of the driver circuit. However, it would have been

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obvious to one of ordinary skill in the art as a matter of design choice to include a mono-flop in the clock line.

Allowable Subject Matter

8. Claims 22- 28are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TANYA NGO whose telephone number is (571) 270-7488. The examiner can normally be reached on M - F from 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngo/

Nov. 2, 2009

/Kenneth N Vanderpuye/

Supervisory Patent Examiner, Art Unit 2613